

Original Article

Assessment of over-the-counter medication use among pregnant women visiting public and private tertiary hospitals in Lahore, Pakistan

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Abstract

Over-the-counter (OTC) medications are considered safe when used as directed agents and are widely used for self-medication due to their accessibility and affordability. However, self-medication during pregnancy can lead to irrational drug use and potential complications. This study aimed to assess the use of OTC medicines among pregnant women visiting public and private tertiary care hospitals in Lahore, Pakistan. A cross-sectional study was conducted over three months in 2023 involving 170 pregnant women at public hospitals and 155 at private hospitals. The data were collected using a structured questionnaire and analyzed using descriptive statistics and chi-square tests. Familiarity with OTC medications was greater among pregnant women visiting public hospitals (56.50%, $p = 0.036$) than among those visiting private hospitals (54.40%). Most women from public hospitals perceived all OTC drugs as safe during pregnancy (64.20%, $p = 0.009$). The perceived critical period for drug use varied, with more pregnant women in private hospitals identifying the first trimester as critical (58.82%, $p = 0.002$), while the third trimester was more commonly perceived as critical by public hospital visitors (62.50%). The use of OTC medication before and during pregnancy was similar between groups ($p > 0.05$). A significant difference was observed in reading OTC medicine leaflets, with more private hospital visitors reading them (60.98%, $p < 0.001$). This study concluded that the proportion of OTC medicine use among pregnant women visiting public and private healthcare facilities in Lahore is moderately high. There were notable differences in the sociodemographic characteristics and perceptions of OTC medication safety. Public hospital visitors were more familiar with OTC medications and believed in their safety during pregnancy, while private hospital visitors were more concerned about the first trimester and more likely to read OTC medicine leaflets. These findings highlight the need for targeted education and counseling to promote safe OTC medication practices among pregnant women.

Keywords

Over-the-counter drug; Nonprescription drugs; Pregnancy; Pregnant women; Pain management; Self-medication; Health knowledge, attitudes, practices

1. Introduction

Over-the-counter (OTC) medicines are commonly referred to as nonprescription medicines, and the Food and Drug Administration (FDA) regards them as safe and efficacious if they are used according to the directions on the label [1]. OTC medication has become the most widely used and accepted form of self-care practice due to its easy access, affordability, and increasing awareness among the public [2]. This trend has encouraged patients to diagnose their own health issues and self-medicate, which can lead

to irrational drug use—a practice that needs to be discouraged [3,4]. The World Health Organization (WHO) defines self-medication as "the preference and consumption of drugs by individuals to cure self-recognized underlying conditions or clinical manifestations" [5].

Self-medication mainly involves the use of OTC drugs and herbal remedies [6,7]. The practice of self-medication during pregnancy has been increasing worldwide. According to the WHO, the prevalence of self-medication during pregnancy was between 30% and 70% in 1998 and 89% in 2013. In addition, 60% of pregnant women take at least one OTC medicine apart from iron supplements and vitamins [8]. The prevalence of self-medication during pregnancy varies across countries: the United States reports an estimated 23%, while Nigeria, Brazil, and India have higher prevalence rates of 72.4%, 92.5%, and 42.8%, respectively. Prevalence rates in Australia, Yazd in Iran, Hyderabad in Pakistan, and Ahvaz in southern Iran range from 30.6% to 66.9%. However, self-medication prevalence rates are low in Arak, Iran (12%), the Netherlands (12.5%), Peru (10.2%), and Portugal (1.3%) [9,10,11].

The most common and widely used OTC drugs among pregnant women include antibiotics (amoxicillin, ciprofloxacin), antifungals (clotrimazole, miconazole), analgesics (acetaminophen, aspirin, ibuprofen, and naproxen) [12,13], antidiarrheal medications (bismuth subsalicylate, kaolin, and pectin preparations), gastrointestinal drugs, including antiemetics (promethazine) [14] and antacids (containing magnesium and calcium) [15], antihistamines (chlorpheniramine), antiasthmatic agents (albuterol), and antihypertensives (nifedipine, atenolol) [16,17,18].

Despite the general belief in the safety of OTC drugs, complications can arise, particularly for pregnant women [19]. It is crucial to use medications cautiously during pregnancy, especially in the first trimester when the primary organs of the fetus are forming, and birth deformities are most likely to occur [20]. Women often consume multiple non-prescription drugs within the first three months of pregnancy to manage symptoms such as nausea, discomfort, vomiting, dizziness, fever, and headaches [21]. However, the intake of such medications typically decreases during the last trimester, especially for category C medicines [22]. Previous studies have indicated that pain is the most frequently addressed complaint during and after pregnancy. Although many OTCs are available, most are contraindicated during pregnancy. Self-medication during pregnancy increases the risk of congenital disabilities, premature delivery, infant death, miscarriage, and several other complications [23,24].

Local studies have reported that the prevalence of OTC use during pregnancy in Pakistan ranges from 53% to 61.3%, primarily involving category X OTC drugs, which have a high risk of causing congenital anomalies [25,26]. The absence of an efficient primary care system, coupled with socioeconomic barriers, often forces the public to seek alternatives to physician consultations [27]. This highlights the importance of incorporating pharmacists into the primary healthcare delivery system to assist patients in selecting OTC medications without contraindications, adjusting doses, and counseling pregnant women on the risks and benefits of minimizing risks to both the mother and fetus [28,29]. Furthermore, due to the lack of local scientific evidence and pharmaco-epidemiological investigations, limited information is available regarding the use of OTC medications by pregnant women in local settings [30]. Therefore, this study was conducted to assess the use of OTC medicines among pregnant women visiting public and private tertiary care hospitals in Lahore, Pakistan.

2. Materials and methods

2.1. Study design

This cross-sectional study was conducted over three months between May and June 2023 in Lahore, Pakistan.

2.2. Ethical approval

The study obtained ethical approval from the Ethical Review Committee (ERC) of the Gulab Devi Institute of Pharmacy, Lahore, Pakistan (No. REC/GDIP/23/D-CP-12).

2.3. Study setting

This study was conducted in the fully operational gynecology departments of two public and three private hospitals providing tertiary care facilities in Lahore.

2.4. Inclusion and exclusion criteria

The study included pregnant women who visited the targeted hospitals during the study period, regardless of their trimester or gravidity, and who provided written informed consent. However, pregnant women with complicated comorbid conditions such as chronic kidney disease, liver dysfunction, or hormonal imbalances were excluded. Additionally, pregnant women who were mentally disabled or had hearing or speaking disabilities were also excluded.

2.5. Sample size

According to the Punjab Health Profile, the estimated annual pregnancy rate among women is 4.5% [31]. Using the Raosoft sample size calculator, the minimum sample size required to maintain a 5% margin of error, a 95% confidence interval, and a response distribution of 4.5% was calculated as 66. The sample size was increased to 175 each for pregnant women visiting public and private hospitals to account for potential nonresponse and variability within the population.

2.6. Sampling method

A convenient sampling method was used to collect data from the study participants.

2.7. Data collection tool

The study utilized a structured questionnaire to gather information from pregnant women regarding their sociodemographic characteristics and OTC medication use. The questionnaire included sections on age, marital status, education, working status at the start of pregnancy, and number of previous children. Additionally, knowledge and awareness of OTC medications, use of OTC medications before and during the current pregnancy, experienced side effects, smoking habits, use of OTC medicines for specific symptoms, use of vitamins, commonly used OTC medicines, and whether the participants read the OTC medicine leaflet were assessed.

2.8. Data collection procedure

The principal and coprincipal investigators conducted face-to-face interviews with pregnant women in the gynecology department, outdoor outpatient departments (OPDs), and gynecology wards. The purpose of the study was verbally explained to all participants before the interviews, and informational leaflets describing the study were also provided

in Urdu. Written informed consent was obtained directly from the patients or their care-givers.

2.9. Statistical analysis

The collected data were entered into the Statistical Package for the Social Sciences (SPSS) version 22.00. Descriptive statistics were calculated to summarize the data. Chi-square tests were used to assess the differences in demographic factors and OTC drug usage patterns among pregnant women visiting public and private tertiary care hospitals in Lahore, Pakistan. The significance level was set at $p < 0.05$.

3. Results

Table 1 shows the significant differences in the sociodemographic characteristics of pregnant women visiting public and private tertiary care hospitals. Most women aged 18-25 years visited private hospitals (75.53%, $p < 0.001$), while those aged 26-35 years were more likely to visit public hospitals (61.35%). Education levels varied significantly, with higher secondary education being more common among visitors to public hospitals (77.19%), whereas primary education and undergraduate education or above were more frequent among visitors to private hospitals (76.62% and 80.77%, respectively, $p < 0.001$). Regarding working status, most housewives visited private hospitals (56.04%), while healthcare and nonhealthcare professionals predominantly visited public hospitals (96.97% and 100.00%, respectively, $p < 0.001$).

Table 1. Demographic profile of pregnant women visiting different tertiary care hospitals.

Sociodemographic Characteristics		Type of Hospital		p Value ^{*, **}
		Public Frequency (%) (N = 170)	Private Frequency (%) (N = 155)	
Age (in years)	18 – 25 years	23 (24.47)	71 (75.53)	< 0.001 **
	26 – 35 years	127 (61.35)	80 (38.65)	
	36 – 45 years	20 (83.33)	4 (16.67)	
Marital status	Married	167 (52.02)	154 (47.98)	0.557
	Widowed	2 (66.67)	1 (33.33)	
	Separated	1 (100.00)	0 (0.00)	
Education	No formal education	26 (59.09)	18 (40.91)	< 0.001 **
	Primary education	18 (23.38)	59 (76.62)	
	Secondary education	33 (51.56)	31 (48.44)	
	Higher secondary education	88 (77.19)	26 (22.81)	
	Undergraduate education or above	5 (19.23)	21 (80.77)	
Working status at start of pregnancy	Student	4 (80.00)	1 (20.00)	< 0.001 **
	Housewife	120 (43.96)	153 (56.04)	
	Healthcare professional	32 (96.97)	1 (3.03)	
	Nonhealthcare professional	14 (100.00)	0 (0.00)	
Prior children	None	68 (54.40)	57 (45.60)	0.002 **
	One	65 (59.63)	44 (40.37)	
	Two	25 (54.35)	21 (45.65)	
	More than two	12 (26.67)	33 (73.33)	

* Sociodemographic characteristics were analyzed using the chi-square test. ** A p value of less than 0.05 is considered statistically significant.

Table 2 shows the general perceptions of OTC medication safety among pregnant women visiting public and private tertiary care hospitals. Familiarity with OTC medications was greater among visitors to public hospitals (56.50%, $p = 0.036$), while a greater proportion of visitors to private hospitals were unfamiliar with OTC medications (54.40%). A greater percentage of women from public hospitals believed that all OTC drugs were safe during pregnancy (64.20%, $p = 0.009$) than did those from private hospitals (35.80%). Regarding the perceived critical period for drug use, more women in private hospitals identified the first trimester as critical (58.82%, $p = 0.002$), whereas the third trimester was more commonly perceived as critical by women in public hospitals (62.50%). Additionally, a greater percentage of women in public hospitals believed that all-natural remedies are safe during pregnancy (69.60%, $p < 0.001$) than those in private hospitals (30.40%).

Table 2. General perceptions of OTC medication safety among pregnant women visiting public and private tertiary care hospitals.

Variables		Type of Hospital		<i>p</i> Value ^{*, **}
		Public	Private	
		Frequency (%) (N = 170)	Frequency (%) (N = 155)	
Familiar with OTC medications	Yes	113 (56.50)	87 (43.50)	0.036 *
	No	57 (45.60)	68 (54.40)	
All OTC drugs are safe in pregnancy	Yes	52 (64.20)	29 (35.80)	0.009 *
	No	118 (48.36)	126 (51.64)	
Perceived critical period for drug use	First trimester	63 (41.18)	90 (58.82)	0.002 *
	Second trimester	17 (60.71)	11 (39.29)	
	Third trimester	85 (62.50)	51 (37.50)	
	Depends on the drug	5 (62.50)	3 (37.50)	
All-natural remedies are safe in pregnancy	Yes	87 (69.60)	38 (30.40)	< 0.001 **
	No	83 (41.50)	117 (58.50)	

* Sociodemographic characteristics were analyzed using the chi-square test. ** A *p* value of less than 0.05 is considered statistically significant.

Table 3 shows that the use of OTC medication before pregnancy was similar between public (53.54%) and private (46.46%) hospital visitors ($p = 0.291$). Similarly, the use of OTC medication during the current pregnancy did not differ significantly between public (53.01%) and private (46.99%) hospital visitors ($p = 0.492$). The experience of side effects from OTC drugs was equally reported by both groups (50.00% each, $p = 0.965$). Table 3 further shows that there was no significant difference in commonly experienced side effects, with the majority reporting no side effects among both public (52.47%) and private (47.53%) hospital visitors. The use of OTC medicines for curing symptoms also did not significantly differ, with pain being the most reported symptom in public (54.76%) and private (45.24%) hospitals ($p = 0.291$). Moreover, the use of vitamins was comparable between the groups, with folic acid being the most commonly used vitamin in both public (51.56%) and private (48.44%) hospitals ($p = 0.514$). The use of paracetamol was slightly greater for public hospital visitors (56.30%) than for private visitors (43.70%), although the difference was not statistically significant ($p = 0.063$). Furthermore, a notable significant difference was observed in the percentage of private hospital visitors (60.98%) who read OTC medicine leaflets compared to that of public hospital visitors (39.02%) ($p < 0.001$).

Table 3. Usage and effects of OTC medication safety among pregnant women visiting public and private tertiary care hospitals.

Variables		Type of Hospital		p Value *, **
		Public	Private	
		Frequency (%) (N = 170)	Frequency (%) (N = 155)	
Use of OTC medication before pregnancy	Yes	121 (53.54)	105 (46.46)	0.291
	No	49 (49.49)	50 (50.50)	
Use of OTC medication during current pregnancy	Yes	44 (53.01)	39 (46.99)	0.492
	No	126 (52.07)	116 (47.93)	
Experienced side effects from OTC drugs	Yes	1 (50.00)	1 (50.00)	0.965
	No	27 (54.00)	23 (46.00)	
	Did not use OTC drugs	142 (52.01)	131 (47.99)	
Commonly experienced side effects	Headache	0 (0.00)	0 (0.00)	0.477
	Cough	0 (0.00)	1 (100.00)	
	Common cold	0 (0.00)	0 (0.00)	
	Constipation	0 (0.00)	0 (0.00)	
	No side effects	170 (52.47)	154 (47.53)	
Use of OTC medicines for cure of symptoms	Pain	23 (54.76)	19 (45.24)	0.291
	Constipation or diarrhea	13 (48.15)	14 (51.85)	
	Allergies	1 (100.00)	0 (0.00)	
	Cough	0 (0.00)	2 (100.00)	
	Common cold	4 (100.00)	0 (0.00)	
	Others	2 (66.67)	1 (33.33)	
	Never used	127 (51.63)	119 (48.37)	
	Pain	23 (54.76)	19 (45.24)	
Use of vitamins	Constipation or diarrhea	13 (48.15)	14 (51.85)	0.514
	Folic acid	66 (51.56)	62 (48.44)	
	Calcium	34 (50.00)	34 (50.00)	
	Iron	35 (49.30)	36 (50.70)	
	Folic acid and iron	5 (41.67)	7 (58.33)	
	Other	19 (67.86)	9 (32.14)	
	More than two vitamins	11 (61.11)	7 (38.89)	
Commonly used OTC medicines	Paracetamol	67 (56.30)	52 (43.70)	0.063
	Ibuprofen	2 (20.00)	8 (80.00)	
	Any painkiller	16 (50.00)	16 (50.00)	
	Antidiarrheal agent	1 (33.33)	2 (66.67)	
	Any laxative	3 (42.86)	4 (57.14)	
	Any cough syrup	37 (45.68)	44 (54.32)	
	Paracetamol and painkiller	6 (35.29)	11 (64.71)	
	Paracetamol, antidiarrheal and cough syrup	7 (77.78)	2 (22.22)	
	Paracetamol and cough syrup	11 (78.57)	3 (21.43)	
	Paracetamol and any laxative	3 (42.86)	4 (57.14)	
	Others	12 (75.00)	4 (25.00)	
Read the OTC medicine leaflet	No medication	5 (50.00)	5 (50.00)	< 0.001 **
	Yes	48 (39.02)	75 (60.98)	
	No	122 (60.40)	80 (39.60)	

* Variables were analyzed using the chi-square test. ** A p value of less than 0.05 is considered statistically significant.

4. Discussion

The results of this study revealed significant differences in the sociodemographic characteristics and perceptions of OTC medication safety among pregnant women visiting public and private tertiary care hospitals. Notably, higher secondary education was more common among public hospital visitors, while primary and higher education were more frequent among private hospital visitors. Additionally, most housewives visited private hospitals, whereas healthcare and nonhealthcare professionals predominantly visited public hospitals. Familiarity with OTC medications was greater among public hospital visitors, whereas a greater proportion of private hospital visitors were unfamiliar with OTC medications. Compared with those from private hospital visitors, more women from public hospitals believe that all OTC drugs and all-natural remedies are safe during pregnancy. The perceived critical period for drug use also differed, with more women in private hospitals identifying the first trimester as critical, while the third trimester was more commonly perceived as critical by public hospital visitors. The use of OTC medication before and during pregnancy and the experience of side effects did not differ significantly between the groups, with most reporting no side effects. The use of OTC medicines for symptom relief and vitamins was comparable between the groups, with folic acid being the most commonly used vitamin. Paracetamol use was slightly greater among public hospital visitors. A significant difference was observed in the number of OTC medicine leaflets, with a greater percentage of private hospital visitors reading them than of public hospital visitors.

A Serbian study supported the results of our study, indicating that sociodemographic factors and education levels play important roles in the use of OTC medicine. The study also highlighted that OTC medicine use is more prevalent among women than men [32]. Another study on consumer behavior also supported these findings, revealing that gender, occupation, income, and education level influence the purchase and choice of OTC medicines [33]. The current study highlighted a significant difference in the level of education and OTC medicine use among pregnant women, supported by another study on self-medication and associated factors among pregnant women. Women with higher education levels were more likely to use OTC medicines than those with lower education levels [34]. Similarly, another study highlighted that age, education, occupation, and area of residence influence pregnant women's knowledge and practices regarding OTC medicine use [35]. However, the results of the current study contrast with a study that found that education level is not a predictor of OTC medicine use in pregnancy [36]. Another study conducted in Denmark also revealed that OTC medicine use was not related to education level among participants [37].

The finding that analgesics were the most commonly used OTC medicine among the participants, with paracetamol having the highest usage, aligns with a study conducted in Nigeria. This study highlighted the high prevalence of OTC medicine use among pregnant women in Nigeria, which can be attributed to psychopathological symptoms [38]. Furthermore, the high prevalence of OTC use can be due to time constraints, high physician fees, long waiting hours at clinics, and limited access to secondary and tertiary healthcare centers [25]. The current study also highlighted that analgesics are among the medicines most commonly used by pregnant women for pain management. This finding is consistent with other studies on OTC analgesic use among pregnant women, which showed that analgesics are widely used by pregnant women worldwide [39]. Many pregnant women experience generalized body pain, headaches, and migraines during pregnancy, leading them to use analgesics, particularly nonsteroidal anti-inflammatory agents [40]. The ease of availability without a prescription, accessibility, and lower cost of some analgesics make them the OTC medicine of choice during pregnancy [41].

Among analgesics, acetaminophen is regarded as the safest during pregnancy, which is why healthcare providers often recommend it, leading to increased consumption by pregnant women for pain management [42].

Calcium is essential for strengthening bones and teeth and maintaining a healthy heart in the fetus, while iron is vital for building immunity in the mother and preventing depression; in the fetus, iron is necessary for red blood cell production [43]. Iron deficiency can lead to premature birth and infant death. The current study's finding of greater calcium and iron use among pregnant women is supported by a study conducted in the United Arab Emirates. This study revealed that pregnant women were well aware of OTC medicines, consumed them at higher rates, and considered them safe. The most commonly used OTC medicines include iron and calcium [44]. This can be attributed to women's increased consciousness about multivitamin intake and healthcare professionals' advice to increase iron and calcium intake during pregnancy [45].

This study included a large sample of pregnant women who were accessible in targeted healthcare facilities but did not consider the safety of the OTC medicines used by the participants. Moreover, the study did not explore the qualitative aspects of the variables, which are potential limitations. Nonetheless, this study provides valuable insights into pregnant women's knowledge of OTC medicines, highlights their OTC medicine use practices, and compares these practices among different groups. These findings emphasize the need for targeted education and counseling to promote safe OTC medication practices among pregnant women and suggest further research into the qualitative aspects and safety of OTC medication use during pregnancy.

5. Conclusions

The study concluded that the proportion of OTC medicine use among pregnant women visiting public and private healthcare facilities in Lahore is moderately high. Significant differences were observed in the sociodemographic characteristics and perceptions of OTC medication safety between public and private hospital visitors. Public hospital visitors were more familiar with OTC medications and more likely to believe in their safety during pregnancy, while private hospital visitors were more concerned about the first trimester and more likely to read OTC medicine leaflets. The perception of the safety of natural remedies during pregnancy in the private sector is also noteworthy. These findings highlight the need to counsel pregnant women on the safe use of OTC drugs and natural remedies during pregnancy, emphasizing targeted education.

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Consent to participate: Informed consent was obtained from all participants involved in the study.

Data availability: The data supporting this study's findings are available from the corresponding author, Iram, upon reasonable request.

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